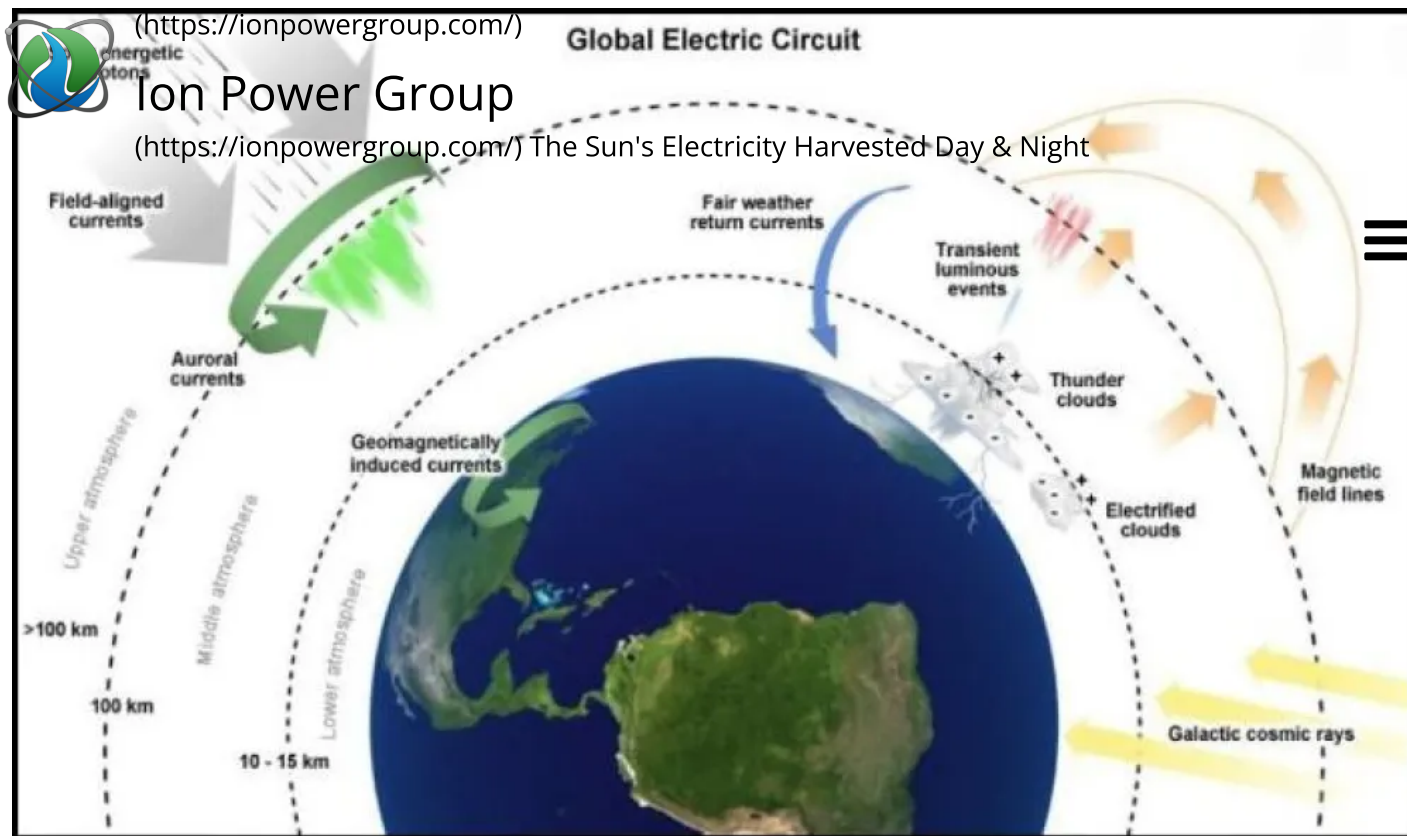


[\(https://ionpowergroup.com/\)](https://ionpowergroup.com/)**Ion Power Group**[\(https://ionpowergroup.com/\)](https://ionpowergroup.com/) The Sun's Electricity Harvested Day & Night

The Sun provides the Earth's atmosphere with 122 quadrillion watts of radiation daily (122,000,000,000,000,000 watts) sustaining a permanently charged electric field that propagates throughout the atmosphere known as the Earth's Global Electric Circuit.

The Global Electric Circuit surrounds the [↑]TOP



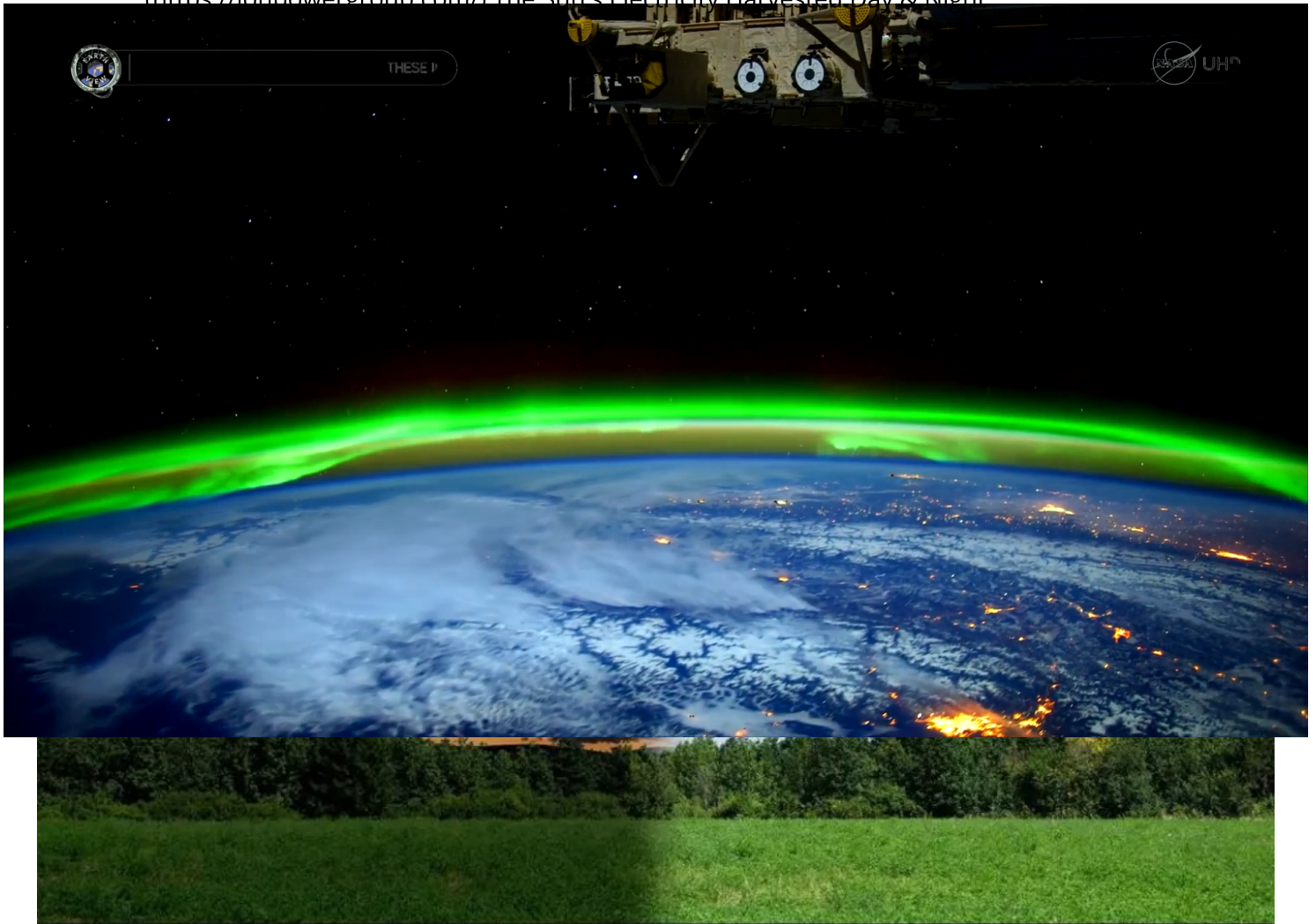
Earth in a blanket of high voltage electricity.



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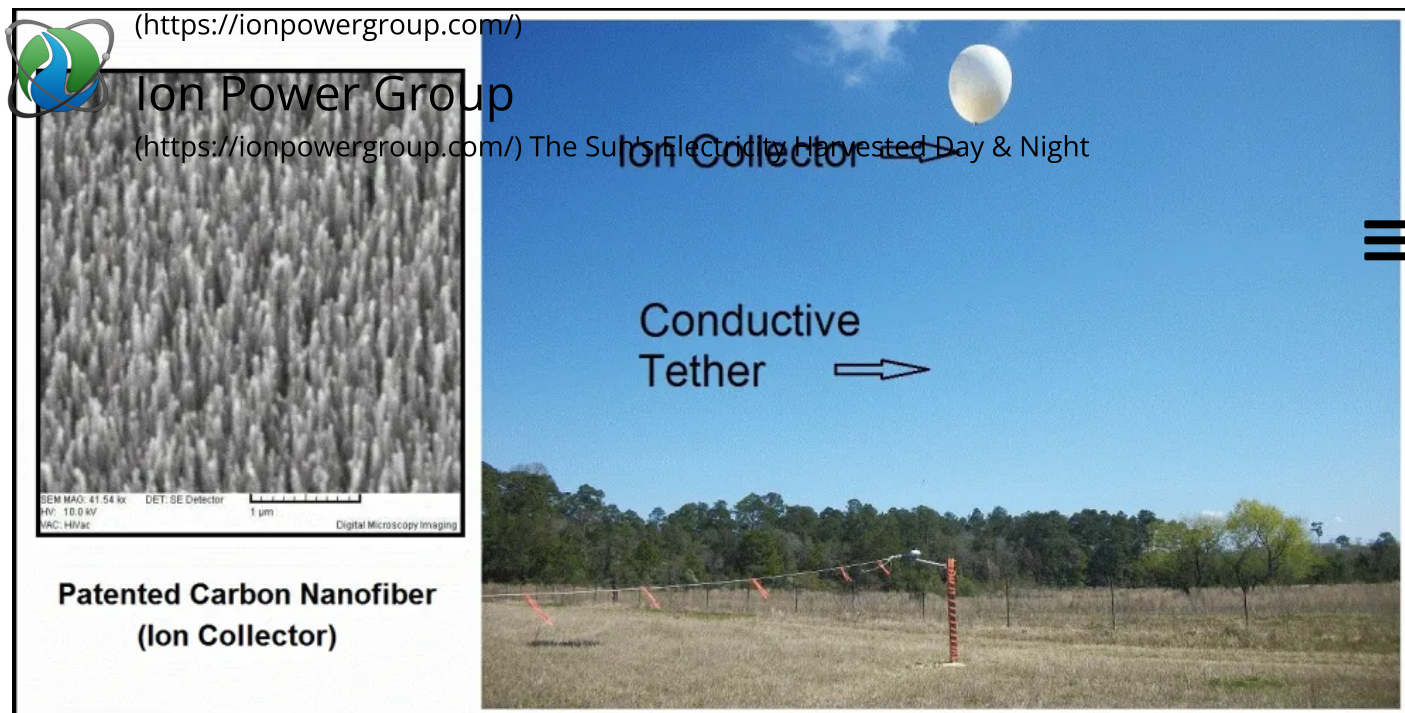
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Trillions of naturally renewable electrically charged ions are continuously produced in the atmosphere, around the clock, day & night, powered by the Sun's enormous energy.

A revolutionary breakthrough in nanomaterial research demonstrates that

↑ TOP



exposing a special type of ultra-lightweight carbon nanomaterial to atmospheric ions harvests high-voltage electricity, day, night, and during storms.

"Physics-based modeling shows that an (<https://secureservercdn.net/198.71.233.128/9a0.99e.myftpuploacontent/uploads/2017/11/Economic-model-study-Rev-B-authored-by-Dr.-Phil-Metzger-PhD.pdf>) electron cloud forms around the ion collector material, and this electron cloud increases conductivity of the air around the collector. This causes electrical current to flow, driven by the atmospheric voltage, so that power is generated at the ground. The rate of this current is governed by complex physics in the boundary layer of the collector material, doubtless because of its very high surface area. Ionization can occur on this collector at extremely low voltages because of the sharp, needle-like protrusions on its surface. This understanding of the physics suggests that power generation can be scaled as surface area,



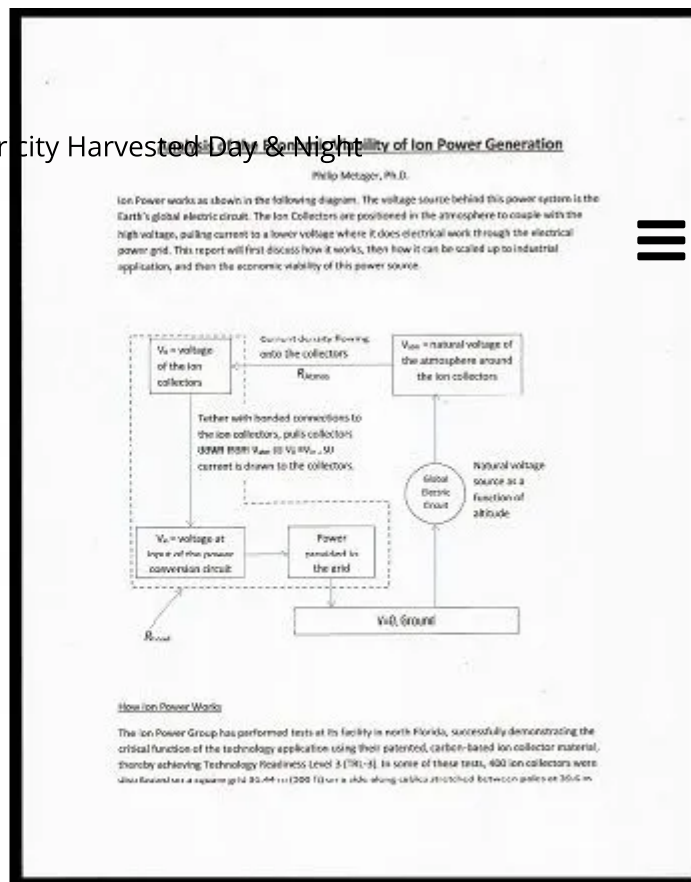
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Dr. Philip Metzger
Planetary Scientist - Physicist PhD
NASA Kennedy Space Center
Scientist/Engineer of the Year



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times voltage. This was incorporated into a simulation of the solar cycle with random storms, and power generation of photovoltaics (PV) and Ion Power were simulated as feeding into a smart grid. Because Ion Power collects the most energy at complementary times compared to PV, the energy storage requirements on the smart grid is greatly reduced. This causes the cost of electricity also to be greatly reduced compared to photovoltaics alone, resulting in energy costs for the overall smart grid of about 8.25 cents per kWh, which is less expensive than any other energy source other than some wind farms (which are only slightly less expensive and have limited geographic applicability). This analysis uses extremely conservative assumptions, so actual energy costs may be much less. **The estimated value to the US economy is between \$62 billion and \$150 billion (annually)** with proportionately large value to the global economy.

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Proof-of-concept tests have successfully demonstrated the powering of different devices by electricity harvested from atmospheric ions, including...



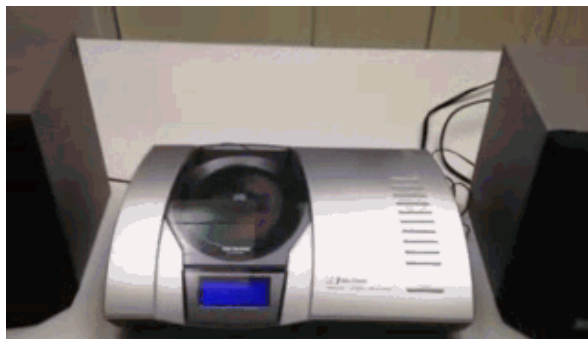
BATTERIES



TELEVISIONS



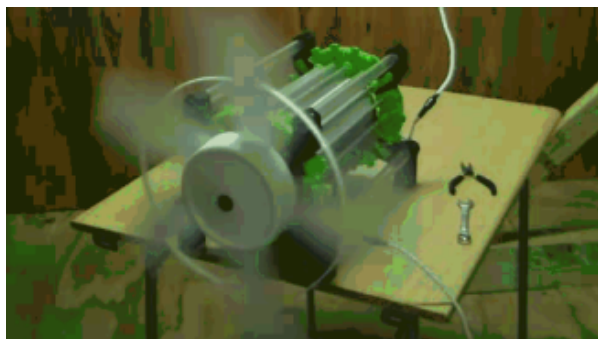
COMPUTERS



MUSIC SYSTEMS



POWER TOOLS



FANS

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Powered by the Sun's radiation about 2,000 thunderstorms are occurring around the Earth at any given moment. On average, across the world there are 4,320,000 lightning discharges each 24 hour period (3000 per minute). This tremendous amount of high voltage electrical energy, together with GCRs bombarding the atmosphere and Radon gas seeping from the Earth's crust in certain areas, combine to help replenish the supply of electrically charged atmospheric ions around the world.



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Ion Harvesting Technology harvests electricity day and night and even during bad weather

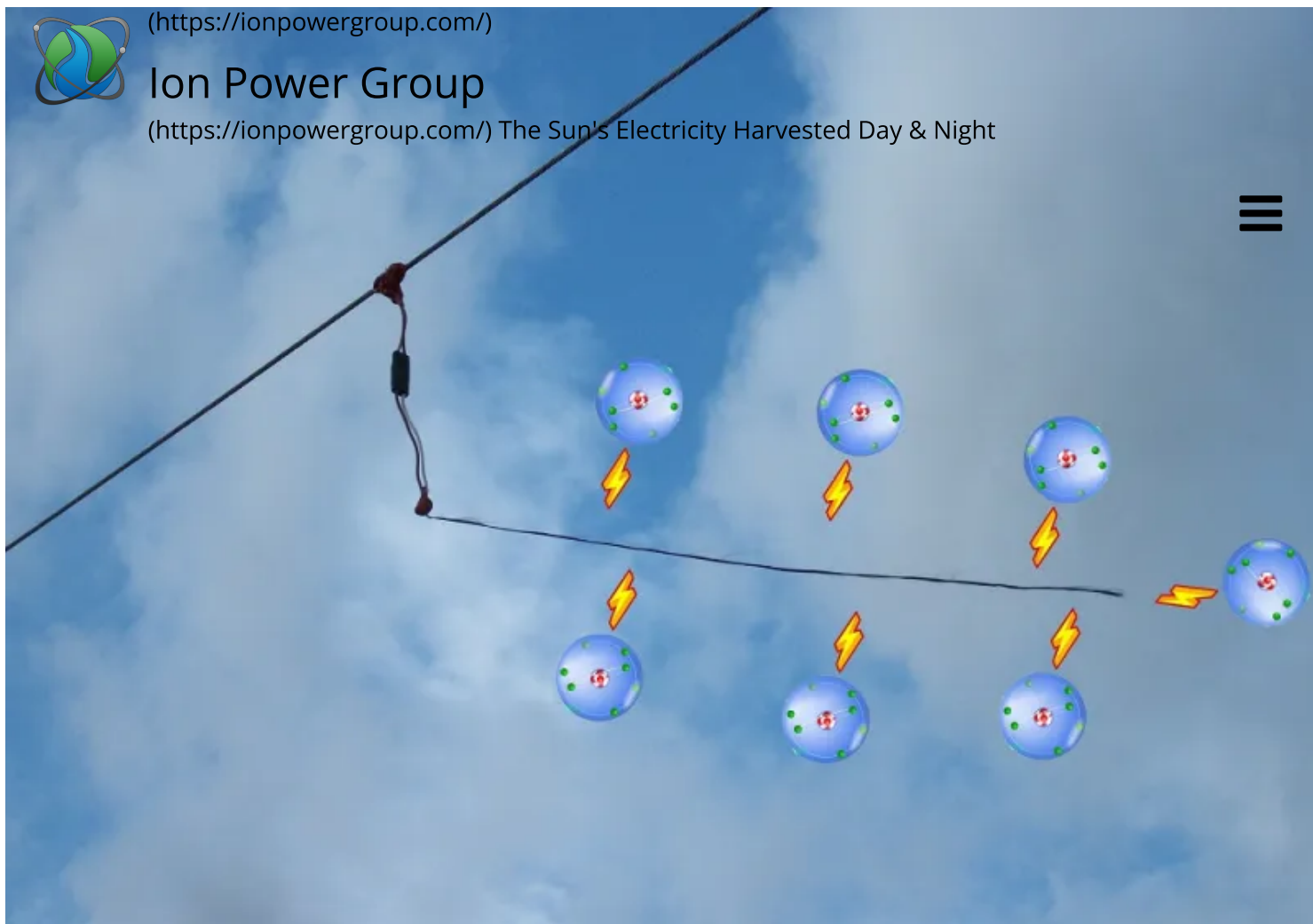
Ion Power Group's ion collectors, when provided with adequate altitude, can harvest the electric charge of near-Earth ions to produce clean renewable high-voltage electricity day and night and during storms. Ion Harvesting Technology should not be confused with other techniques that attempt to capture lightning bolts or harvest manmade radio frequency (RF) energy.



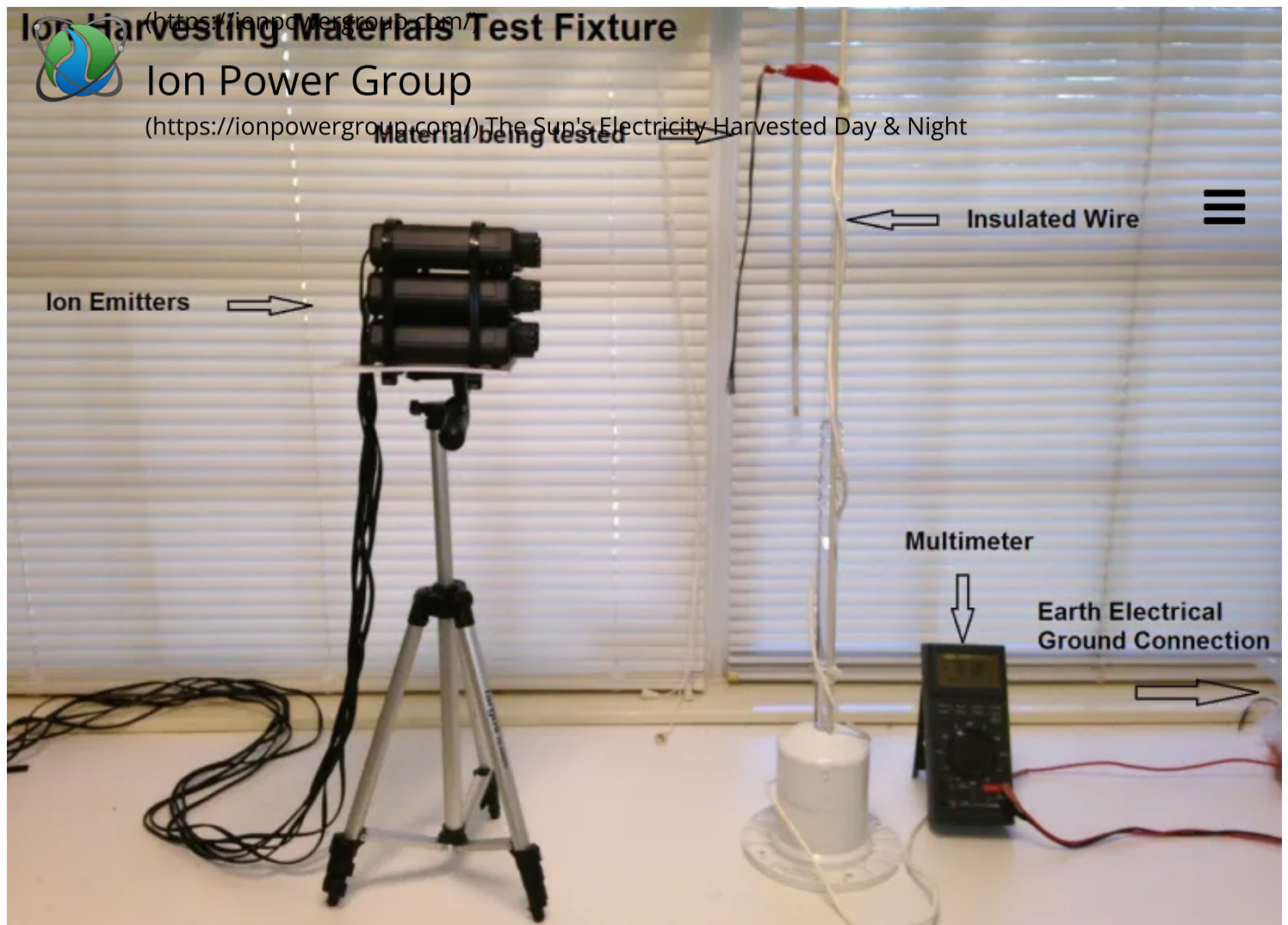
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(<https://i0.wp.com/ionpowergroup.com/wp-content/uploads/2016/09/Ion-Collector-harvesting-ions-PLAIN.jpg?ssl=1>)



(<https://i0.wp.com/ionpowergroup.com/wp-content/uploads/2016/10/Ion-Harvesting-Table-Top-Assembly-annotated.jpg?ssl=1>)

Ion collectors can be composed of carbon/graphite/graphene, while not metallic, are electrically conductive, flexible and durable. Electric fields are known to coalesce at conductive points known as the “Corona Effect”. The solution of Poisson’s equation to determine electric field intensity around the collectors shows us that the highest electric fields will be around sharp points; the sharper the point, the greater the electric field. Ion collectors offer millions of microscopic electrically conductive points

↑ TOP



and protrusions which readily couple to the electric fields of near-Earth ions transferring high-voltage electricity from the atmospheric ions to the ion collectors.

$$\nabla^2 \varphi = -\frac{\rho}{\epsilon}.$$

Ground based circuitry maintains the ion collector material at a voltage considerably lower than the surrounding atmospheric ions thereby employing the electrostatic attraction principle causing nearby ions to migrate to the ion collectors. High voltage wire connected to the ion collectors convey the harvested high voltage DC electricity to a storage medium or electrical load to produce work. Measurements have shown that ion collectors made of graphite are more efficient at harvesting electricity from airborne ions than all other tested metals. In some tests, by as much as 55x greater efficiency. Some of the tested metals include highly conductive silver, copper, and aluminum wire – aluminum spheres – copper and aluminum sheets.

The below graphs show voltage and current coupling characteristics comparing metal in one test (indicated as red and green) to carbon/graphite (indicated as purple).

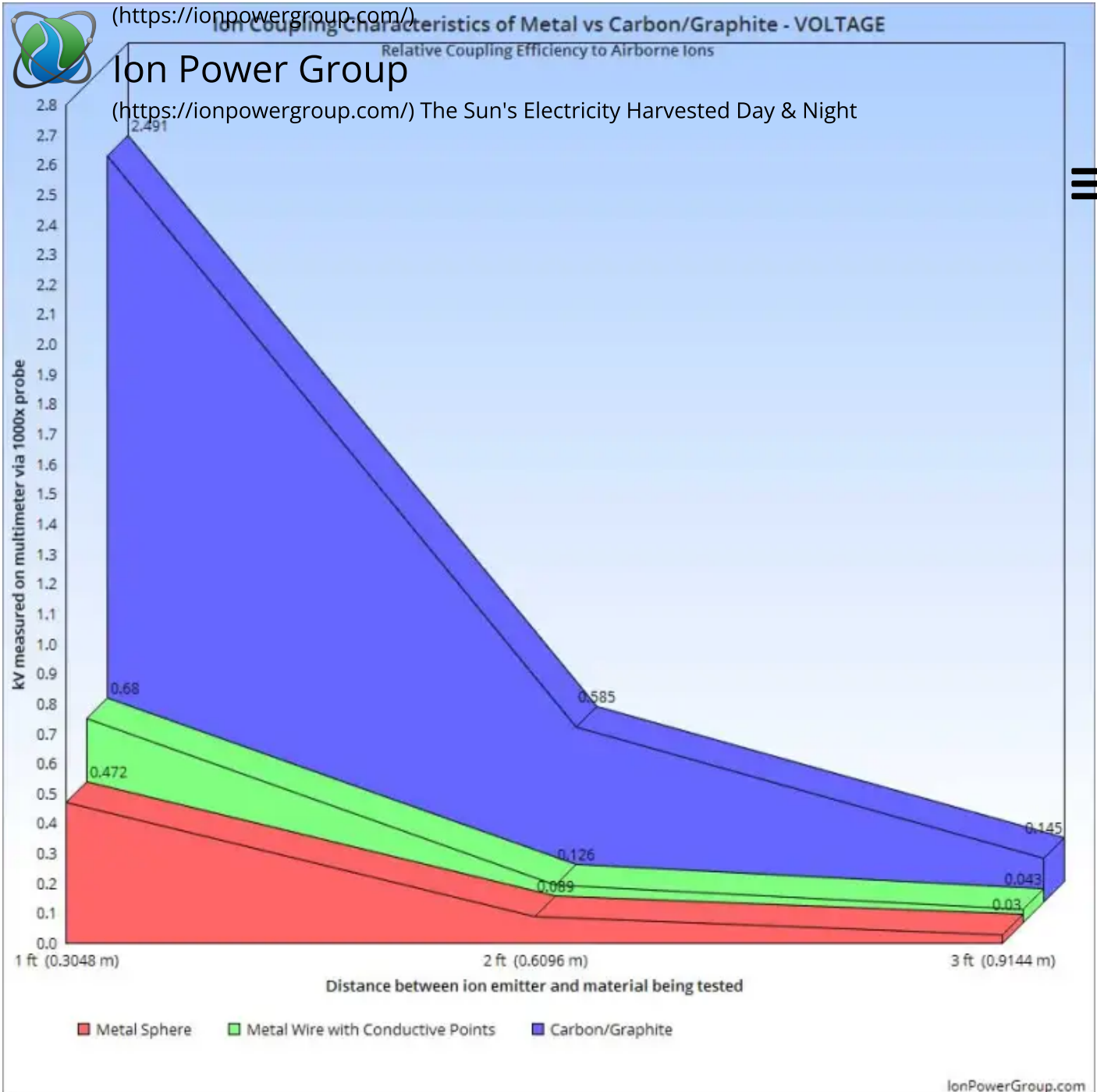




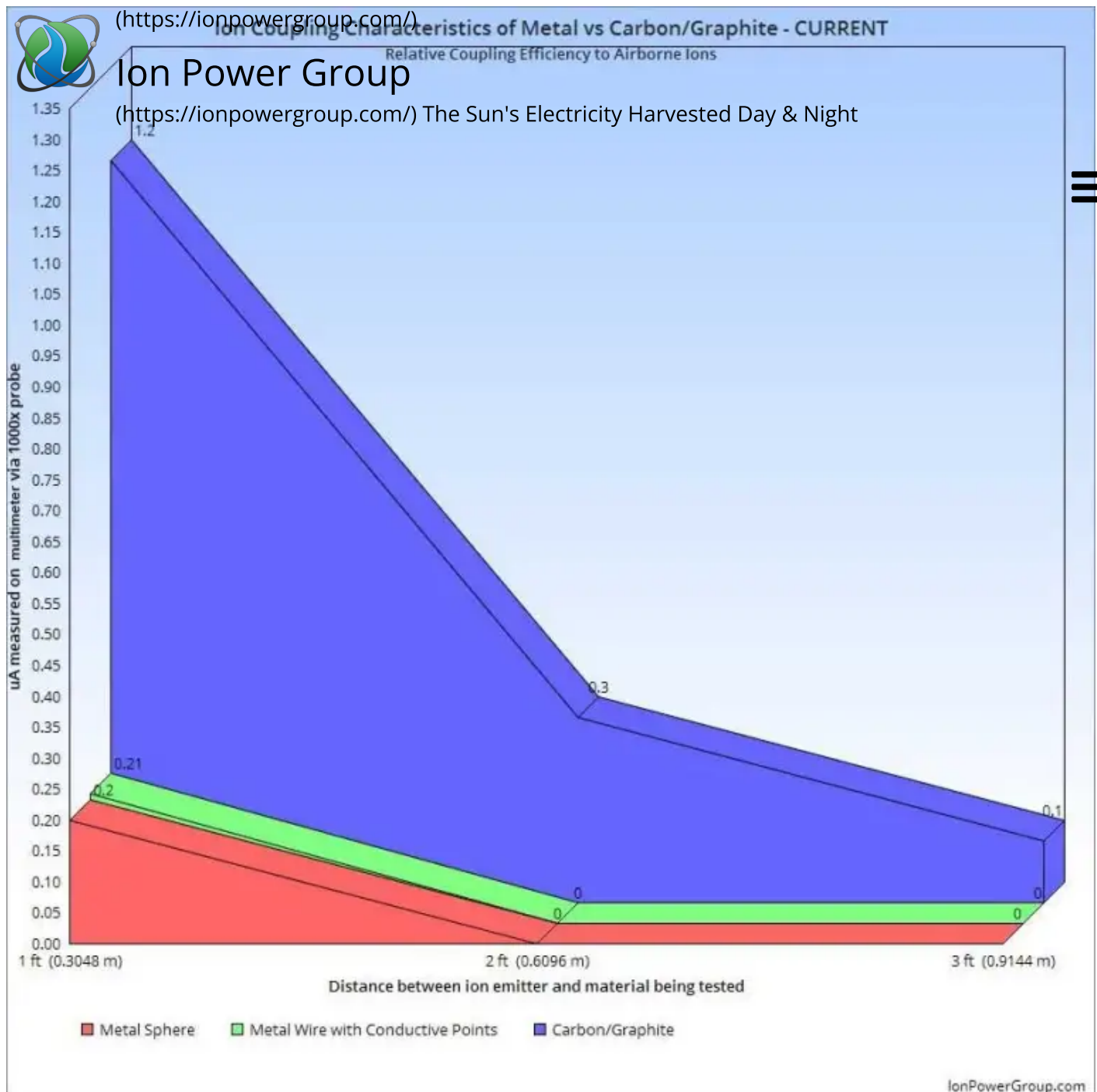
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(/wp-content/uploads/2016/07/Ion-Coupling-Characteristics-VOLTAGE-1.jpg)



(/wp-content/uploads/2016/07/Ion-Coupling-Characteristics-CURRENT.jpg)

Electricity is produced by providing sufficient altitude to the ultra lightweight ion collector through the use of long-duration aerial

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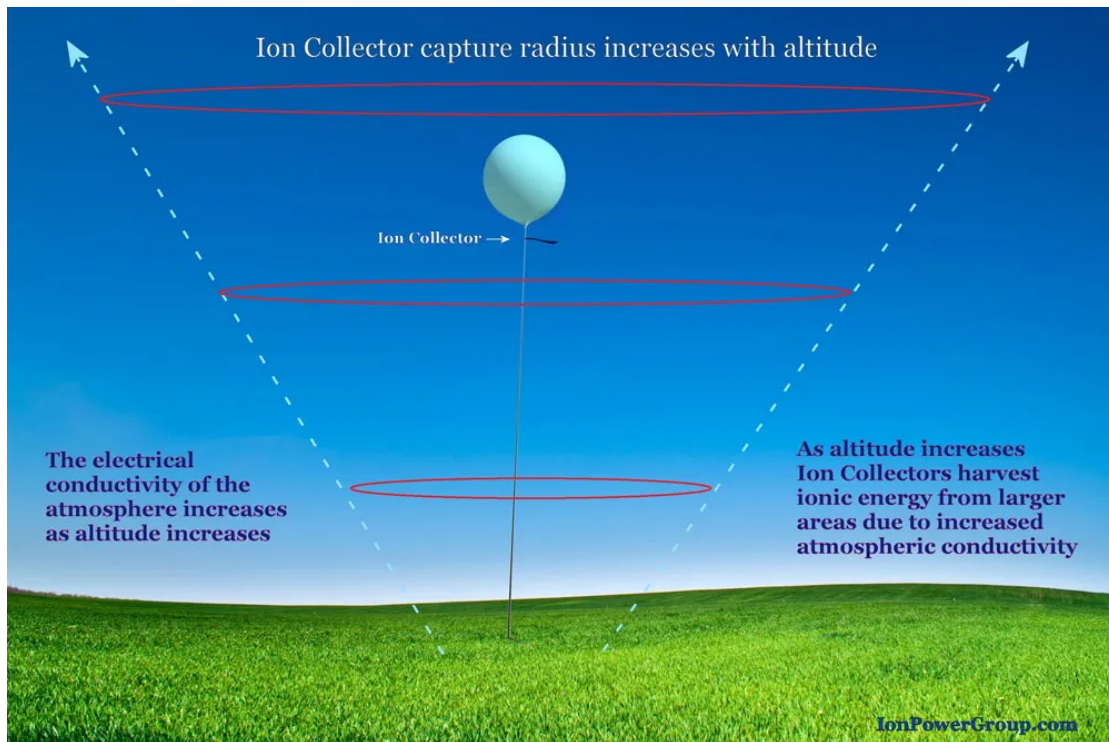


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platforms including tethered balloon, kite or tower. Atmospheric voltage increases at the rate of approximately 90-150vdc per meter of altitude above ground level or sea level and many orders of magnitude greater during disturbed weather. Experiments have



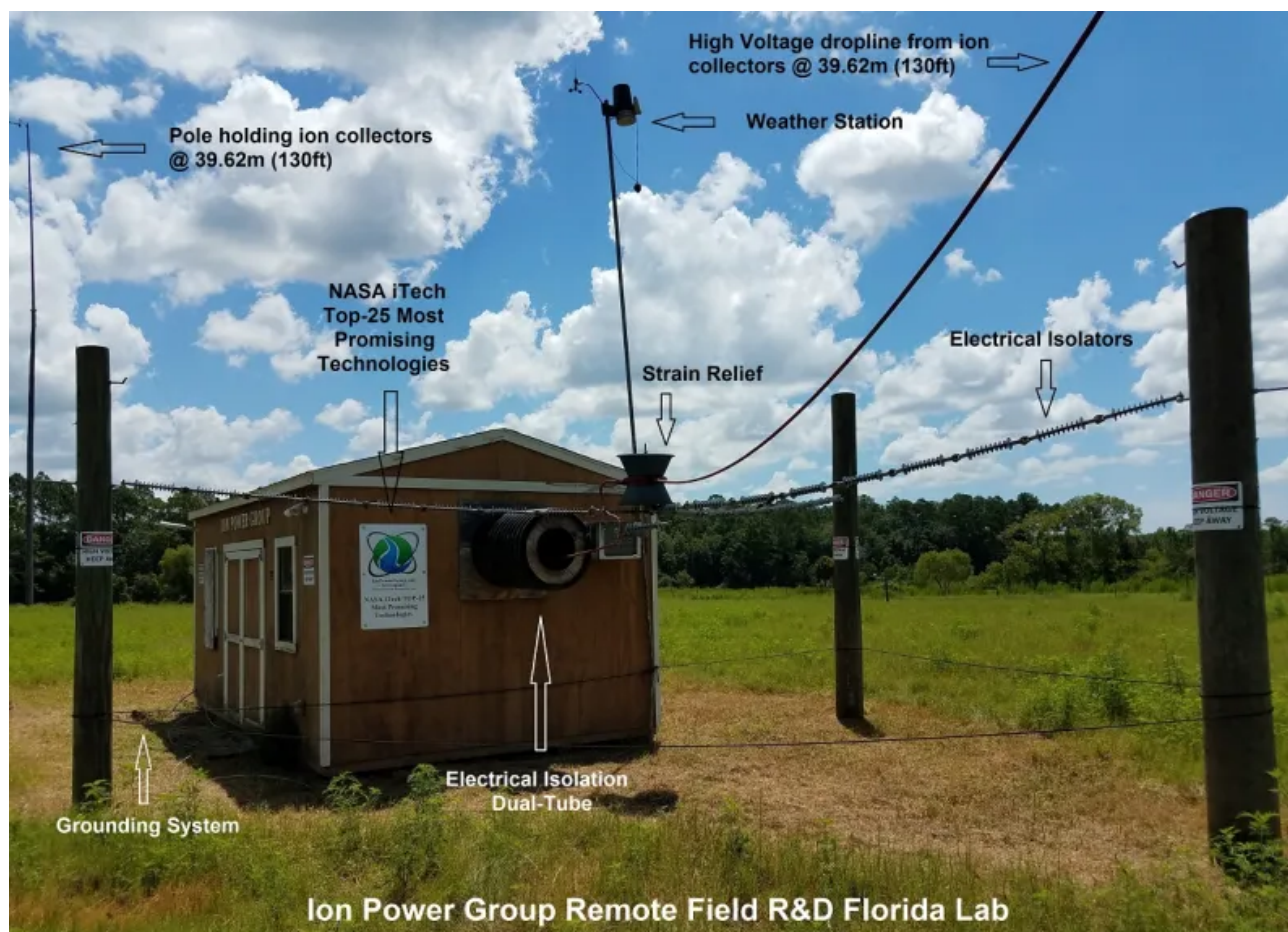
Atmospheric voltage increases about 90-150vdc per meter of altitude



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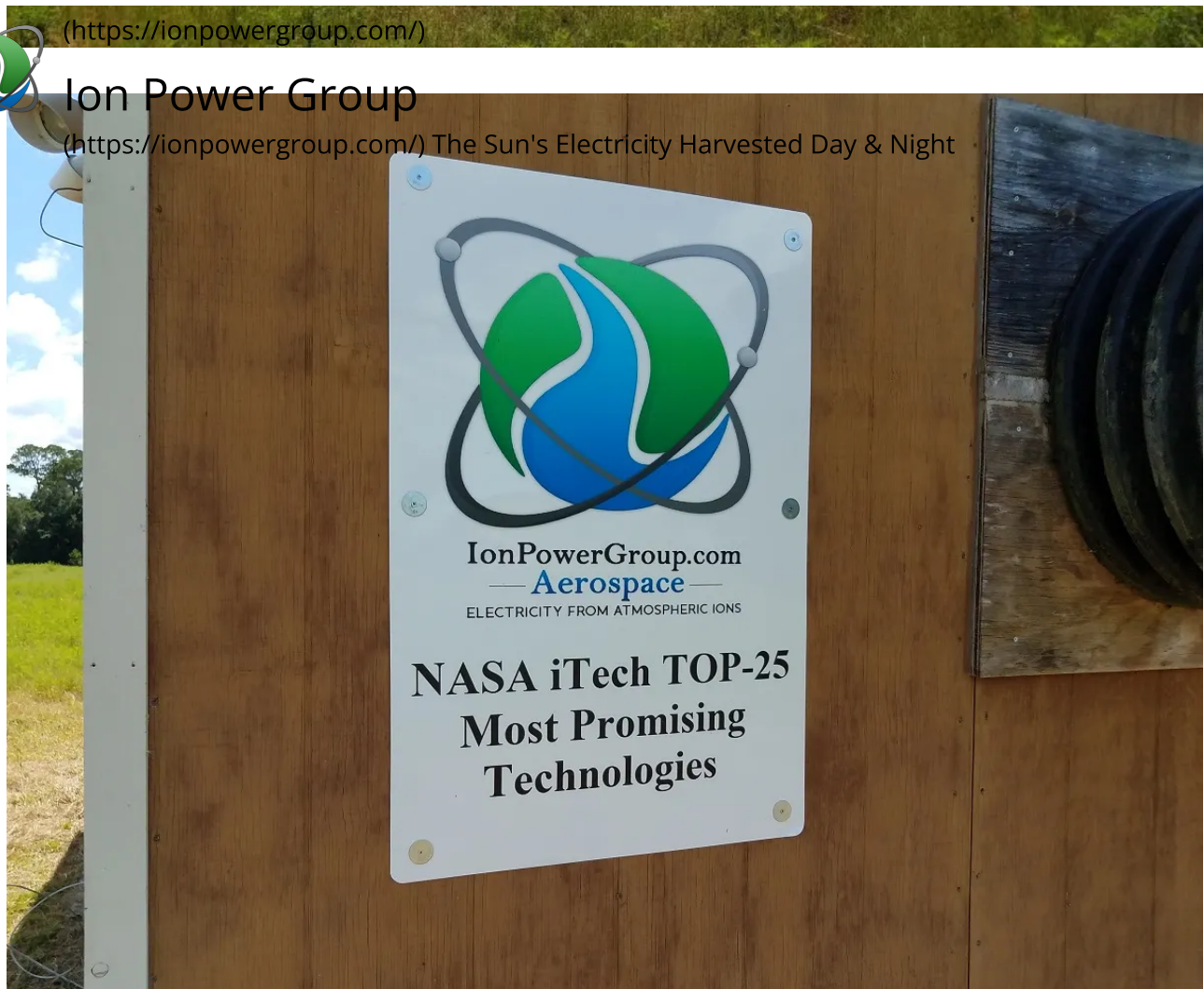




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(<https://i0.wp.com/ionpowergroup.com/wp-content/uploads/2018/08/Ion-Power-Group-Test-Site-08-05-2018-100.jpg?ssl=1>)



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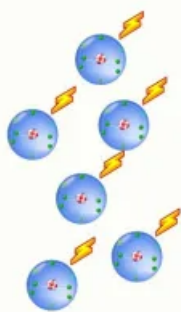
Electricity harvested from Airborne Ions + Water = Hydrogen Gas



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Ion Power Group has been awarded patents for installing ion collectors on automobiles to generate electricity including through the Triboelectric Effect. Preliminary field tests in which a truck, equipped with Ion Collectors, demonstrated that the concept can generate >500 volts when the vehicle is in motion. Initial tests are encouraging, however, further development is required in order to realize automobiles that generate their own supplemental electricity (or onboard hydrogen gas from water) through use of Ion Collectors.





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illustrations (below) of proposed experimental ion power plants using long-duration aerostats (aerostats or balloons) or kites or towers to provide altitude to the ion collectors to harvest ions for electricity, day and night. Future Ion Harvesting Technology embodiments that use long-duration aerostats (balloons) to provide great altitude to ion collectors offer a theoretical energy producing duty-cycle approaching 99%.



(<https://i0.wp.com/ionpowergroup.com/wp-content/uploads/2020/03/Ion-Harvesting-Farm-ORIGINAL1.2-scaled.jpg?ssl=1>)